

The Association of Value-Based Purchasing Pay-For-Performance Program on Patient Mortality in U.S. Hospitals: Appendix (Online-Only Material)

Figueroa JF, Tsugawa Y, Zheng J, Orav EJ, Jha AK

Contents:

1. **Supplementary Material 1:** Overview of the Hospital Value Based Purchasing Program
2. **Table A:** ICD-9 (International Classification of Diseases, 9th Edition) Codes of Medical Conditions Used in Analyses
3. **Table B:** Hospital Characteristics by Type: HVBP-participating hospitals, Maryland hospitals, and critical access hospitals
4. **Figure A:** Mortality trend for target conditions between HVBP-participating hospitals, Maryland hospitals, and critical access hospitals
5. **Table C:** Trends in mortality of target conditions between HVBP hospitals and Maryland hospitals
6. **Table D:** Trends in mortality of target conditions between HVBP hospitals and critical access hospitals
7. **Table E:** Trends in mortality of target conditions between HVBP hospitals and non-HVBP hospitals, using logistic regression models
8. **Table F:** Trends in mortality of non-target conditions between HVBP hospitals and non-HVBP Hospitals
9. **Table G.** Trends in mortality of non-target conditions between HVBP hospitals and Maryland hospitals
10. **Table H:** Trends in mortality between poor performers at HVBP hospitals vs. non-HVBP poor performers
11. **Table I:** Impact of HVBP by hospital characteristics

Supplementary Material 1: Overview of the Hospital Value Based Purchasing Program

The federal government's goal for the Hospital Value Based Purchasing Program (HVBP) was to begin paying for inpatient acute care services based on quality of care. It began by identifying what consumers and payers valued most: better health outcomes, better health delivery models, better consumer experience, and cost-efficient care. Therefore, CMS defined quality of care based on measures on four separate domains of care: clinical processes of care domain, the patient experience of care domain, the outcome domain, and the efficiency domain. Each domain was composed of a set of measures that hospitals were already publicly reporting.

CMS rewards hospitals based on either 1) how well they perform on each measure compared to the average hospital ("achievement" score), and 2) how much hospitals improve their performance on each measure compared to their performance during a baseline period ("improvement score"). Each hospital's total performance is assessed by comparing its achievement score and improvement score for each applicable measure. CMS uses a threshold (50th percentile) and benchmark (mean of the top decile) to determine how many points are awarded for the achievement and improvement score. For each measure, CMS uses whichever one is greater. Points are added across the measures and a total performance score is given for each domain of care.

Each domain is then weighted differently depending on the fiscal year and it has varied over time with the inclusion of more measures. In fiscal year 2013, 70% of the incentive was determined by performance on the process domain while 30% was determined by performance on the experience domain. In Fiscal Year 2015, 45% of the incentive was determined by performance on the process domain, 30% on the experience domain, and 25% was determined on performance on the outcome domain.

Please see table below for HVBP measurement periods, domain weights, and individual measures under each domain.

1a. HVBP Measurement Periods for Individual Domains:

Domains		FY13 (1%)		FY14 (1.25%)	
		Baseline	Performance	Baseline	Performance
Process		07/01/09 - 03/31/10	07/01/11 - 03/31/12	04/01/10 - 12/31/10	04/01/12 - 12/31/12
Experience		07/01/09 - 03/31/10	07/01/11 - 03/31/12	04/01/10 - 12/31/10	04/01/12 - 12/31/12
Outcome	Mortality	NA	NA	07/01/09 - 06/30/10	07/01/11 - 06/30/12
	PSI-90	NA	NA	NA	NA
	HAC	NA	NA	NA	NA
Efficiency		NA	NA	NA	NA
Domains		FY15 (1.5%)		FY16 (1.75%)	
		Baseline	Performance	Baseline	Performance
Process		01/01/11 - 12/31/11	01/01/13 - 12/31/13	01/01/12 - 12/31/12	01/01/14 - 12/31/14
Experience		01/01/11 - 12/31/11	01/01/13 - 12/31/13	01/01/12 - 12/31/12	01/01/14 - 12/31/14
Outcome	Mortality	10/01/10 - 06/30/11	10/01/12 - 06/30/13	10/01/10 - 06/30/11	10/01/12 - 06/30/14
	PSI-90	10/15/10 - 06/30/11	10/15/12 - 06/30/13	10/15/10 - 06/30/11	10/15/12 - 06/30/14
	HAC	01/01/11 - 12/31/11	02/01/13 - 12/31/13	01/01/12 - 12/31/12	01/01/14 - 12/31/14
Efficiency		05/01/11 - 12/31/11	05/01/13 - 12/31/13	01/01/12 - 12/31/12	01/01/14 - 12/30/14

1b. HVBP Weights for Individual Domains:

Domain	FY13 (1%)	FY14 (1.25%)	FY15 (1.5%)	FY16 (1.75%)
Process	70%	45%	20%	10%
Experience	30%	30%	30%	25%
Outcome		25%	30%	40%
Efficiency			20%	25%

1c. Clinical Process Domain Measures

Measure ID	Measure Description	FY13	FY 2014	FY 2015	FY 2016
Process Domain Weight in VBP		70%	45%	20%	10%
AMI-7a	Fibrinolytic Therapy Received Within 30 Minutes of Hospital Arrival	X	X	X	X
AMI-8a	Primary PCI Received Within 90 Minutes of Hospital Arrival	X	X	X	
HF-1	Discharge Instructions	X	X	X	
IMM-2	Influenza Immunization				X
PN-3b	Blood Cultures Performed in the Emergency Department Prior to Initial Antibiotic Received in Hospital	X	X	X	
PN-6	Initial Antibiotic Selection for CAP in Immuno-competent Patient	X	X	X	X
SCIP-Card-2	Surgery Patients on a Beta Blocker Prior to Arrival That Received a Beta Blocker During the Perioperative Period	X	X	X	X
SCIP-Inf-1	Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision	X	X	X	
SCIP-Inf-2	Prophylactic Antibiotic Selection for Surgical Patients	X	X	X	X
SCIP-Inf-3	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	X	X	X	X
SCIP-Inf-4	Cardiac Surgery Patients with Controlled 6AM Postoperative Serum Glucose	X	X	X	
SCIP-Inf-9	Postoperative Urinary Catheter Removal on Post Operative Day 1 or 2		X	X	X
SCIP-VTE-1	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	X	X		
SCIP-VTE-2	Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis Within 24 Hours Prior to Surgery to 24 Hours After Surgery	X	X	X	X

1d. Patient Experience Domain

Patient Experience Measurements (FY13-16)
Communication with Nurses
Communication with Doctors
Responsiveness of Hospital Staff
Pain Management
Communication about Medicines
Cleanliness and Quietness
Discharge Information
Overall Rating of Hospital

1e. Clinical Outcomes Domain

	Measure Description	FY13	FY14	FY15	FY16
MORT-30-AMI	Acute Myocardial Infarction (AMI) 30-Day Mortality Rate		X	X	X
MORT-30-HF	Heart Failure (HF) 30-Day Mortality Rate		X	X	X
MORT-30 PN	Pneumonia (PN) 30-Day Mortality Rate		X	X	X
PSI-90	Complication/Patient safety for selected indicators (Composite)			X	X
CLABSI	Central Line-Associated Blood Stream Infection			X	X
CAUTI	Catheter-Associated Urinary Tract Infection				X
SSI	SSI - Colon Surgery				X
	SSI - Abdominal Hysterectomy				

1f. Efficiency Domain (FY15-16):

Medicare Spending per Beneficiary (MSPB) – Part A and B spending from 3 days before hospitalization to 30 days after discharge for common medical conditions.

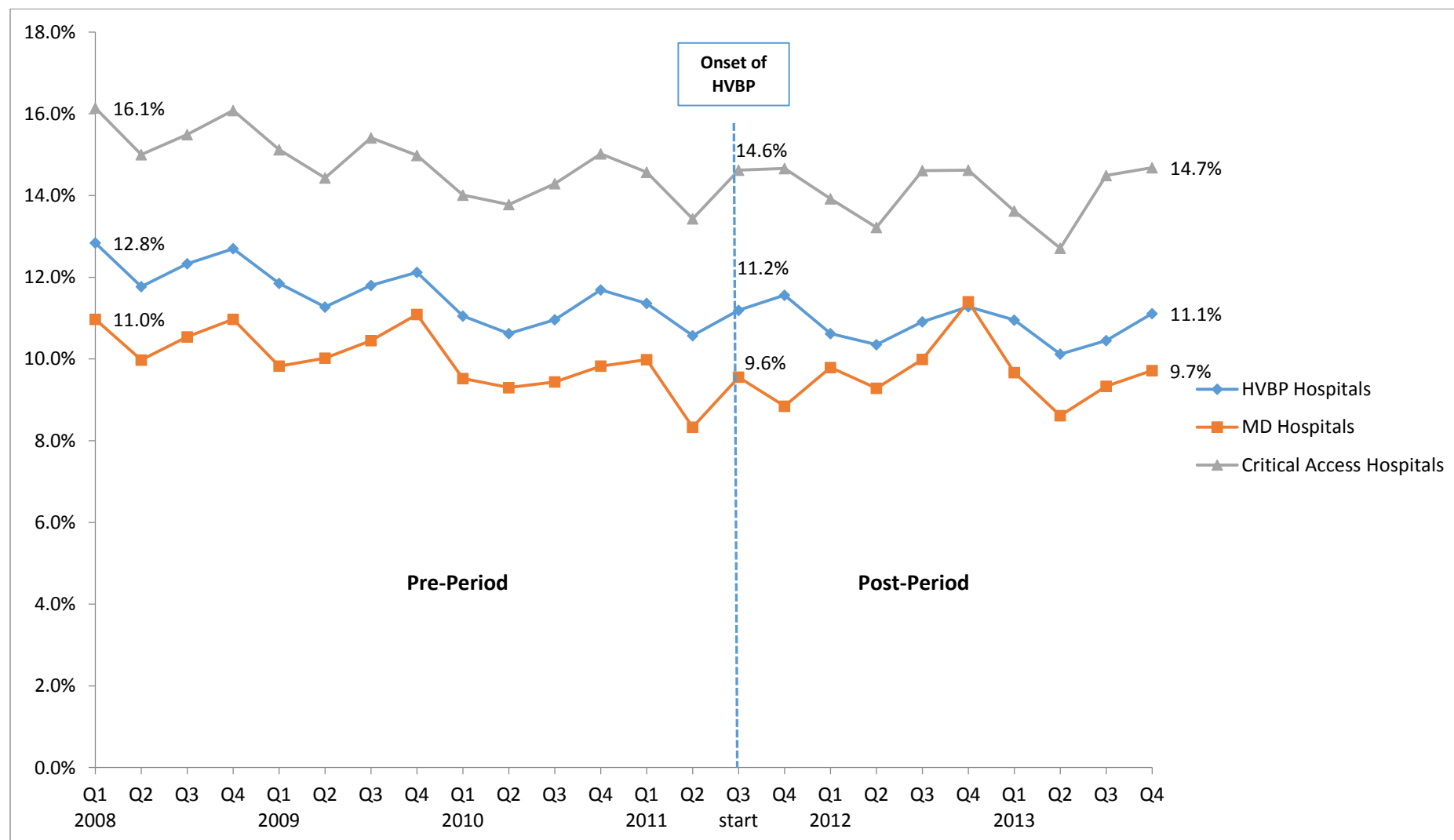
Supplementary Table A: ICD-9 (International Classification of Diseases, 9th Edition) Codes

Condition	ICD-9s
Acute myocardial infarction	410.xx, excluding 410.x2
Congestive heart failure	398.91, 404.x1, 404.x3, 428.0 - 428.9
Pneumonia	480 - 486
Stroke	430, 431, 4320, 4321, 4329, 43301, 43311, 43321, 43331, 43381, 43391, 43401, 43411, 43491
Sepsis	0031, 0362, 0363, 03689, 0369, 0380, 03810, 03811, 03819, 0382, 0383, 03840, 03841, 03842, 03843, 03844, 03849, 0388, 0389, 0545, 78552, 78559, 7907, 99590, 99591, 99592, 99593, 99594
Esophagitis and gastroenteritis	0030, 0040, 0041, 0042, 0043, 0048, 0049, 0050, 0053, 0054, 581, 589, 0059, 0060, 0061, 062, 0071, 0074, 0078, 00800, 00801, 00802, 00804, 00809, 0082, 0083, 00841, 00842, 00843, 00844, 00845, 00846, 00847, 00849, 0085, 00861, 00862, 00863, 00867, 00869, 0088, 0090, 0091, 0092, 0093, 11284, 11285, 1231, 1269, 1271, 1272, 1273, 1279, 129, 22804, 2712, 2713, 3064, 4474, 5300, 53010, 53011, 53012, 53019, 5303, 5304, 5305, 5306, 53081, 53083, 53084, 53089, 5309, 53500, 53510, 53520, 53530, 53540, 53550, 53560, 5360, 5361, 5362, 5363, 5368, 5369, 5371, 5372, 5374, 5375, 5376, 53781, 53782, 53789, 5379, 5523, 5533, 5583, 5589, 56200, 56201, 56210, 56211, 56400, 56401, 56402, 56409, 5641, 5642, 5643, 5644, 5645, 5646, 56481, 56489, 5649, 5790, 5791, 5792, 5793, 5794, 5798, 5799, 78701, 78702, 78703, 7871, 7872, 7873, 7874, 7876, 7877, 78791, 78799, 78900, 78901, 78902, 78903, 78904, 78905, 78906, 78907, 78909, 78930, 78931, 78932, 78933, 78934, 78935, 78936, 78937, 78939, 78960, 78961, 78962, 78964, 78966, 78967, 78969, 7899, 7921, 7934, 7936
Gastrointestinal bleeding	4560, 5307, 53082, 53100, 53101, 53120, 53121, 53140, 53141, 53160, 53161, 53200, 53201, 53220, 53221, 53240, 53241, 53260, 53261, 53300, 53301, 53320, 53340, 53341, 53360, 53400, 53401, 53420, 53440, 53441, 53460, 53501, 53511, 53521, 53531, 53541, 53551, 53561, 53783, 53784, 56202, 56203, 56212, 56213, 5693, 56985, 5780, 5781, 5789
Urinary tract infection	01600, 01634, 03284, 1200, 59000, 59010, 59011, 5902, 5903, 59080, 5909, 5933, 5950, 5951, 5952, 5953, 59581, 59589, 5959, 5970, 59780, 59781, 59789, 5990
Nutritional or metabolic disorder	2510, 2512, 2513, 260, 261, 262, 2630, 2631, 2638, 2639, 2651, 2661, 2662, 2669, 267, 2689, 2690, 2691, 2692, 2693, 2698, 2699, 2752, 27540, 27541, 27542, 27549, 2760, 2761, 2762, 2763, 2764, 2765, 27650, 27651, 27652, 2766, 2767, 2768, 2769, 27700, 27800, 27801, 27802, 2781, 2783, 2784, 2788, 7817, 7830, 7831, 78321, 78322, 7833, 78340, 78341, 7835, 7836, 7837, 7839, 79021, 79029
Arrhythmia	4260, 42610, 42611, 42612, 42613, 4262, 4263, 4264, 42650, 42651, 42652, 42653, 42654, 4266, 4267, 42681, 42682, 42689, 4269, 4270, 4271, 4272, 42731, 42732, 42741, 42742, 42760, 42761, 42769, 42781, 42789, 4279, 7850, 7851, 99601, 99604
Renal failure	40301, 40311, 40391, 40402, 40412, 40492, 5845, 5846, 5847, 5848, 5849, 585, 5851, 5852, 5853, 5854, 5855, 5856, 5859, 586, 7885, 9585

Supplementary Table B: Hospital Characteristics by Type

Hospital Characteristics	VBP Hospitals	Maryland hospitals	Critical Access Hospitals	P-value
Total	2919	44	1304	
Annual Medicare volume, mean	2671	4562	246	<0.0001
Hospital size (%)	<i>No. (%)</i>	<i>No. (%)</i>	<i>No. (%)</i>	
<i>Small</i>	808 (27.7%)	6 (13.6%)	1243 (95.3%)	<0.0001
<i>Medium</i>	1676 (57.4%)	30 (68.2%)	61 (4.7%)	
<i>Large</i>	435 (13.9%)	8 (18.2%)	0 (0%)	
Ownership (%)				
<i>For-profit</i>	594 (20.4%)	1 (2.3%)	70 (5.4%)	<0.0001
<i>Private non-profit</i>	1892 (64.8%)	43 (97.7%)	691 (53.0%)	
<i>Public</i>	433 (14.8%)	0 (0%)	543 (41.6%)	
Teaching (%)				
<i>Major</i>	262 (9.0%)	6 (13.6%)	0 (0%)	<0.0001
<i>Minor</i>	699 (24.0%)	14 (31.8%)	72 (5.5%)	
<i>Non-teaching</i>	1958 (67.1%)	24 (54.6%)	1232 (94.5%)	
Region (%)				
<i>Northeast</i>	474 (16.2%)	0 (0%)	66 (5.1%)	<0.0001
<i>Midwest</i>	698 (23.9%)	0 (0%)	627 (48.1%)	
<i>South</i>	1187 (40.7%)	44 (100%)	342 (26.3%)	
<i>West</i>	560 (19.2%)	0 (0%)	269 (20.6%)	
Proportion Medicaid patients, median (IQR)	18.0% (13.3%, 22.9%)	18.3% (14.5%, 23.3%)	11.6% (6.7%, 17.5%)	<0.0001
Proportion Medicare patients, median (IQR)	47.5% (41.5%, 53.4%)	44.7% (39.1%, 48.7%)	57.9% (51.6%, 69.5%)	<0.0001

Supplementary Figure 1: Risk-Adjusted 30-day mortality rates for target conditions between HVBP-participating hospitals, Maryland hospitals, and critical access hospitals



Supplementary Table C: Trends in mortality of target conditions between HVBP hospitals and Maryland hospitals

	Quarterly change in mortality (%)		Difference-in-difference in trend (% point difference) [95% CI]	P-value for Diff-in-Diff
	HVBP Hospitals	Maryland Hospitals		
Target conditions				
Pre-slope*	-0.14%	-0.12%	-0.02% [-0.08% - 0.13%]	0.69
Post-slope**	-0.03%	0.01%		
Difference (95% CI)	0.10% [0.09%-0.12%]	0.13% [0.02% - 0.23%]		
AMI				
Pre-slope	-0.18%	-0.12%	0.07% [-0.25% - 0.21%]	0.62
Post-slope	-0.04%	-0.05%		
Difference (95% CI)	0.14% [0.10%-0.18%]	0.07% [-0.20% - 0.35%]		
CHF				
Pre-slope	-0.07%	-0.08%	-0.02% [-0.13% - 0.17%]	0.78
Post-slope	0.02%	0.04%		
Difference (95% CI)	0.10% [0.07%-0.12%]	0.12% [-0.03% - 0.26%]		
PNA				
Pre-slope	-0.15%	-0.14%	-0.07% [-0.11% - 0.25%]	0.43
Post-slope	-0.07%	0.01%		
Difference (95% CI)	0.08% [0.05% - 0.10%]	0.15% [-0.03% - 0.33%]		
Non-target conditions				
Pre-slope	-0.09%	-0.09%	-0.04% [-0.03% - 0.11%]	0.22
Post-slope	-0.02%	0.02%		
Difference (95% CI)	0.07% [0.06 - 0.08%]	0.11% [0.05% - 0.18%]		

Supplementary Table D: Trends in mortality of target conditions between HVBP hospitals and critical access hospitals

	Quarterly change in mortality (%)		Difference-in-difference in trend (% point difference) [95% CI]	P-value for Diff-in-Diff
	HVBP Hospitals	Critical Access Hospitals		
Target conditions				
Pre-slope*	-0.14%	-0.16%	-0.02% [-0.04% - 0.08%]	0.45
Post-slope**	-0.03%	-0.02%		
Difference (95% CI)	0.11% [0.09% - 0.12%]	0.13% [0.07% - 0.19%]		
AMI				
Pre-slope	-0.19%	-0.21%	-0.06% [-0.20% - 0.32%]	0.64
Post-slope	-0.04%	-0.01%		
Difference (95% CI)	0.14% [0.10% - 0.18%]	0.20% [-0.05% - 0.46%]		
CHF				
Pre-slope	-0.08%	-0.12%	-0.05% [-0.04% - 0.15%]	0.28
Post-slope	0.02%	0.03%		
Difference (95% CI)	0.10% [0.08% - 0.12%]	0.15% [0.06% - 0.25%]		
PNA				
Pre-slope	-0.16%	-0.16%	-0.03% [-0.05% - 0.10%]	0.53
Post-slope	-0.07%	-0.05%		
Difference (95% CI)	0.08% [0.06% - 0.11%]	0.11% [0.03% - 0.18%]		
Non-target conditions				
Pre-slope	-0.10%	-0.05%	-0.04% [-0.08% - 0.01%]	0.14
Post-slope	-0.02%	-0.03%		
Difference (95% CI)	0.07% [0.06% - 0.08%]	0.04% [-0.01% - 0.09%]		

Supplementary Table E: Trends in Mortality between HVBP hospitals and non-HVBP hospitals, using logistic regression

	Quarterly change in odds of death		Difference-in-difference in trends [95% CI]**	P-value for Diff-in-Diff
	HVBP Hospitals	non-HVBP Hospitals		
Target conditions				
Pre-intervention	0.98	0.98	1.00 [0.99-1.00]	0.64
Post-intervention	0.99	0.99		
Difference [95% CI]*	1.00 [0.99-1.00]	1.00 [0.99-1.00]		
AMI				
Pre-intervention	0.98	0.99	1.00 [0.98-1.01]	0.59
Post-intervention	1.00	1.00		
Difference [95% CI]	1.02 [1.01-1.02]	1.01[0.99-1.03]		
CHF				
Pre-intervention	0.99	0.99	1.00 [0.99-1.01]	0.41
Post-intervention	1.00	1.00		
Difference [95% CI]	1.01 [1.00-1.01]	1.01 [1.00-1.02]		
PNA				
Pre-intervention	0.98	0.98	1.00 [1.00-1.01]	0.50
Post-intervention	0.99	1.00		
Difference [95% CI]	1.01 [1.00-1.01]	1.01 [1.00-1.02]		
Non-target conditions				
Pre-intervention	0.98	0.99	1.00 [0.99-1.00]	0.60
Post-intervention	1.00	1.00		
Difference [95% CI]	1.01 [1.01-1.01]	1.01 [1.01-1.02]		

Logistic regression model with hospital fixed effects.

* The result shown is the multiplicative difference between the quarterly odds ratio for death post-intervention compared - pre-intervention.

** The result shown is the multiplicative difference between the pre-post change in the odds ratio for death over time in non-HVBP hospitals compared - HVBP hospitals

Supplementary Table F: Trends in Mortality of non-target conditions between HVBP hospitals and non-HVBP Hospitals

	Quarterly change in mortality		Difference-in-difference in trend (% point difference) [95% CI]	P-value for Diff-in-Diff
	HVBP Hospitals	non-HVBP Hospitals		
Non-Target conditions				
Pre-intervention	-0.09%	-0.06%	0.01% [-0.03% - 0.05%]	0.61
Post-intervention	-0.02%	0.00%		
Difference (95% CI)	0.07% [0.06 - 0.08%]	0.06% [0.02% - 0.10%]		
Stroke				
Pre-intervention	-0.18%	-0.11%	0.01% [-0.15% - 0.17%]	0.90
Post-intervention	-0.07%	-0.01%		
Difference (95% CI)	0.11% [0.07% - 0.15%]	0.10% [-0.05% - 0.26%]		
Esophagitis/Gastritis				
Pre-intervention	-0.08%	-0.04%	0.05% [-0.02% - 0.11%]	0.19
Post-intervention	-0.01%	-0.01%		
Difference (95% CI)	0.07% [0.05% - 0.09%]	0.02% [-0.04% - 0.09%]		
GIB				
Pre-intervention	-0.09%	-0.10%	0.01% [-0.10% - 0.12%]	0.86
Post-intervention	-0.01%	-0.03%		
Difference (95% CI)	0.08% [0.06% - 0.11%]	0.07% [-0.03% - 0.18%]		
UTI				
Pre-intervention	-0.10%	-0.11%	-0.02% [-0.10% - 0.06%]	0.59
Post-intervention	-0.02%	0.00%		
Difference (95% CI)	0.08% [0.06% - 0.11%]	0.11% [0.03% - 0.19%]		
Metabolic Disease				
Pre-intervention	-0.01%	0.04%	0.05% [-0.06% - 0.16%]	0.37
Post-intervention	0.02%	0.02%		
Difference (95% CI)	0.02% [-0.01% - 0.06%]	-0.03% [-0.13% - 0.08%]		
Arrhythmias				
Pre-intervention	-0.05%	0.02%	0.03% [-0.04% - 0.11%]	0.35
Post-intervention	0.01%	0.00%		
Difference (95% CI)	0.05% [0.04 - 0.07%]	0.02% [-0.05% - 0.09%]		
Renal Failure				
Pre-intervention	-0.17%	-0.31%	-0.19% [-0.37% - 0.02%]	0.03
Post-intervention	-0.05%	0.00%		
Difference (95% CI)	0.11% [0.08% - 0.15%]	0.31% [0.13% - 0.48%]		

Supplementary Table G: Trends in Mortality of non-target conditions between HVBP hospitals and Maryland hospitals

	Quarterly change in mortality (%)		Difference-in-difference in trend (% point difference) [95% CI]	P-value for Diff-in-Diff
	HVBP Hospitals	Maryland Hospitals		
Non-Target conditions				
Pre-intervention	-0.09%	-0.09%	-0.04% [-0.11% - 0.03%]	0.22
Post-intervention	-0.02%	0.02%		
Difference (95% CI)	0.07% [0.06%-0.08%]	0.11% [0.05%- 0.18%]		
Stroke				
Pre-intervention	-0.18%	-0.17%	-0.05% [-0.29% - 0.19%]	0.68
Post-intervention	-0.07%	-0.01%		
Difference (95% CI)	0.11% [0.07%-0.15%]	0.16% [-0.07%-0.40%]		
Esophagitis/gastritis				
Pre-intervention	-0.08%	-0.09%	0.02% [-0.11% - 0.14]	0.80
Post-intervention	-0.01%	0.00%		
Difference (95% CI)	0.07% [0.05% - 0.09%]	0.05% [-0.07%-0.17%]		
GIB				
Pre-intervention	-0.09%	-0.07%	0.02% [-0.15% - 0.19%	0.85
Post-intervention	-0.01%	0.00%		
Difference (95% CI)	0.08% [0.06% - 0.11%]	0.07% [-0.10% -0.23%]		
UTI				
Pre-intervention	-0.10%	-0.16%	-0.13% [-0.29% - 0.03%]	0.10
Post-intervention	-0.02%	0.06%		
Difference (95% CI)	0.08% [0.06% - 0.11%]	0.22% [0.06% - 0.37%]		
Metabolic Disease				
Pre-intervention	-0.01%	-0.06%	-0.15% [-0.37% - 0.07%]	0.18
Post-intervention	0.02%	0.11%		
Difference (95% CI)	0.02% [-0.01% - 0.06%]	0.17% [-0.05% - 0.39%]		
Arrhythmias				
Pre-intervention	-0.05%	0.01%	0.06% [-0.05% - 0.17%]	0.25
Post-intervention	0.01%	0.00%		
Difference (95% CI)	0.05% [0.04 - 0.07%]	-0.01% [-0.12% - 0.10%]		
Renal Failure				
Pre-intervention	-0.17%	-0.16%	-0.14% [-0.38% - 0.10%]	0.27
Post-intervention	-0.05%	0.08%		
Difference (95% CI)	0.11% [0.08% - 0.15%]	0.25% [0.01% - 0.48%]		

Supplementary Table H: Trends in Mortality between poor performers at HVBP hospitals vs. non-HVBP hospitals

	Quarterly change in mortality		Difference-in-difference in trend (% point difference) [95% CI]	P-value for Diff-in-Diff
	HVBP “Poor-Performers”	Non-HVBP “Poor Performers”		
Target Conditions				
Pre-intervention	-0.04%	-0.03%	0.03% [-0.06% - 0.12%]	0.50
Post-intervention	-0.23%	-0.25%		
Difference (95% CI)	-0.20% [-0.24% - -0.16%]	-0.22% [-0.31% - -0.14%]		

Supplementary Table I: Impact of HVBP by Hospital Characteristics

	Quarterly change in mortality (%)		Difference-in-difference in trend (% point difference) [95% CI]	P-value for Diff-in-Diff
	HVBP Hospitals	Non-HVBP Hospitals		
Hospital Operating Margins				
Lowest Tertile				0.71
Pre-intervention	-0.11%	-0.10%	0.0004% [-0.01% - 0.001%]	
Post-intervention	-0.04%	-0.03%		
Difference [95% CI]	0.07% [-0.02% - 0.16%]	0.07% [0.03% - 0.10%]		
Medium Tertile				
Pre-intervention	-0.13%	-0.13%	0.05% [-0.04% - 0.14%]	
Post-intervention	0.03	-0.02%		
Difference [95% CI]	0.16% [0.08% - 0.24%]	0.11% [0.08% - 0.14%]		
Highest Tertile				
Pre-intervention	-0.14%	-0.12%	0.05% [-0.06% - 0.17%]	
Post-intervention	0.02%	-0.02%		
Difference [95% CI]	0.16% [0.05% - 0.27%]	0.11% [0.08% - 0.13%]		
Medicare Proportion				
Lowest Tertile				0.15
Pre-intervention	-0.09%	-0.13%	-0.09% [-0.21% - 0.04%]	
Post-intervention	-0.07%	-0.03%		
Difference [95% CI]	0.02% [-0.11% - 0.14%]	0.10% [0.08% - 0.13%]		
Medium Tertile				
Pre-intervention	-0.12%	0.12%	0.04% [-0.05% - 0.14%]	
Post-intervention	-0.02%	-0.02%		
Difference [95% CI]	0.14% [0.05% - 0.24%]	0.10% [0.07% - 0.13%]		
Highest Tertile				
Pre-intervention	-0.14%	-0.11%	0.06% [-0.02% - 0.15%]	
Post-intervention	0.03%	0.00%		
Difference [95% CI]	0.17% [0.09% - 0.24%]	0.10% [0.07% - 0.14%]		
Market Competitiveness				
Lowest Tertile				0.83
Pre-intervention	-0.10%	-0.12%	0.01% [-0.09% - 0.10%]	
Post-intervention	0.01%	-0.02%		
Difference [95% CI]	0.10% [0.02% - 0.19%]	0.10% [0.07% - 0.12%]		
Medium Tertile				
Pre-intervention	-0.14%	-0.12%	0.05% [-0.05% - 0.15%]	
Post-intervention	0.01%	-0.02%		
Difference [95% CI]	0.15% [0.06% - 0.24%]	0.10% [0.07% - 0.13%]		
Highest Tertile				
Pre-intervention	-0.15%	-0.13%	0.03% [-0.07% - 0.13%]	
Post-intervention	-0.01%	-0.02%		
Difference [95% CI]	0.14% [0.04% - 0.23%]	0.10% [0.08% - 0.13%]		